FINAL

EYE ONE
RESTORATION PLAN
FLORIDA KEYS NATIONAL MARINE SANCTUARY
MONROE COUNTY, FL

Prepared by:

National Oceanic and Atmospheric Administration
Florida Department of Environmental Protection

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1. Introduction

This document presents the proposed actions and financial costs for the response, damage assessment, and restoration of injured seagrasses as a result of the *Eye One* grounding incident of July 4, 2001. This incident occurred in state waters within the boundaries of the Florida Keys National Marine Sanctuary (FKNMS). The National Oceanic and Atmospheric Administration (NOAA) and the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, ("State of Florida" or "state") are the co-trustees for the natural resources within the FKNMS.

1.1 Common Seagrass Injuries

Seagrass injuries in the FKNMS typically include a combination of propeller scars and blowholes (Sargent et al. 1995). Seagrass injuries are formed by the dredging effect of the turning propeller or occasionally the vessel's hull as the boat travels over a shallow bank. The severity (width and depth) of propeller scars varies depending on many factors including the size of the vessel and the extent to which the propeller is forced into the seagrass bed. Another common injury feature, known as a "blowhole," is formed from the concentrated force of propeller wash, either from the grounded vessel attempting to power off the bank or the propeller wash of the salvage vessel pulling the grounded vessel off the bank. The depth and area of the blowholes also vary depending on the size of the vessel, extent of power used to remove the vessel, and type of seagrass bed substrate.

1.2 Economic and Ecological Importance of Seagrass

Healthy seagrass communities serve critical ecological and economic functions in the Florida Keys. The predominant species of seagrasses are *Thalassia testudinum*, *Syringodium filiforme*, and *Halodule wrightii*. From an ecological perspective, seagrass beds serve as nursery habitat and as a source of food for numerous species of fish. In turn, the viability of the recreational and commercial fishing industries depends on healthy seagrass communities. Seagrass beds function as effective storm surge buffers for the Keys and also serve as natural filters to reduce the level of sediment and nutrients in the water. Restoration of seagrass injuries represents an important step in reducing the cumulative impact of seagrass groundings throughout the FKNMS and in preserving this important ecosystem.

2. RESTORATION

2.1 Natural Resource Damage Assessment

Prior to implementing a restoration project, a natural resource damage assessment (NRDA) is conducted to assess the extent of the injury, anticipated recovery time, compensatory restoration requirements, and anticipated costs associated with the response, assessment and restoration process.

To fully compensate the public for lost resources and services, the co-trustees require primary restoration and compensatory restoration. "Primary restoration" refers to restoration at the actual grounding site as necessary to restore seagrass communities to their pre-injury "baseline" level. "Baseline" refers to the level of ecological services (type, quality, and density of seagrass) provided in the area prior to the incident. Baseline conditions are measured via standard field assessment techniques in the seagrass immediately adjacent to the injured areas (control areas).[1] "Compensatory restoration" compensates the public for ecological services lost during the time it takes the seagrass injury to recover to baseline conditions. Compensatory restoration projects are usually completed in similar types of off-site injured seagrass habitats.

The National Marine Sanctuary Act (NMSA), 16 U.S.C.§1443(d)(2) (A), (B), and (C), define the appropriate uses of recovered damages in order of priority as "(A) to restore, replace, or acquire the equivalent of the sanctuary resources that were the subject of the action…; (B) to restore degraded sanctuary resources of the national marine sanctuary that was the subject of action, giving priority to sanctuary resources and habitats that are comparable to the sanctuary resources that were the subject of the action; and (C) to restore degraded sanctuary resources of other national marine sanctuaries." Under the NMSA and state law, NOAA and the State of Florida serve as co-trustees in recovering seagrass damages and implementing restoration projects.

3. RESTORATION ALTERNATIVES

3.1 Restoration Techniques

The following is a list of the most common techniques for seagrass restoration.

3.1.1 No-Action

The no-action alternative serves as a benchmark against which other alternatives are evaluated. The no-action alternative can have two general outcomes: 1) natural recovery on a longer time scale relative to active restoration alternatives, or 2) further deterioration of the seagrass bed.

A no-action alternative relies on natural re-colonization of seagrass species and natural sediment filling of blowholes and propeller scars. A no-action alternative can increase the risk of secondary injury to nearby seagrass communities from the unstable conditions created by wide propeller scars and blowholes at the grounding site. Progressive deterioration of seagrass injuries from storm and hurricane force wave energy has been documented to expand seagrass injuries in such cases (Whitfield et al. in press). The no-action alternative is most often used for grounding cases when NOAA and the State of Florida determine an injury site is more likely to recover in a short period of time with a low

[1] For more information please see the injury assessment report.

likelihood of injury expansion, or where other social, environmental, or logistical considerations dictate that no-action is the best course.

3.1.2 Bird Stakes

In most areas of the FKNMS seagrasses are nutrient limited.[2] Vessel injuries that disturb the sediment nutrient reservoir and physically alter the properties of the substrate further exacerbate this condition. A method of fertilization that utilizes the nutrient composition of bird feces deposited from bird roosting stakes ("bird stakes" or "stakes"), has been documented to be an effective treatment to encourage re-growth of seagrasses into disturbed sediments and/or faster growth of seagrass transplants (Fourqurean et al. 1992a; Fourqurean et al. 1992b; Fourqurean et al. 1995; Kenworthy et al. 2000).

The construction and placement of bird stakes will follow published guidelines (Fonseca et al. 1998; Kenworthy et al. 2000). To be effective, bird staking requires that bird feces reach the seafloor in effective concentrations. Water depths of one meter or less at high tide are generally considered ideal for bird staking. At water depths greater than one-meter bird stakes will not be used. Depending on how water depth changes over the injury area, the length of each stake may vary slightly in order to maintain approximately 0.5m elevation above the high water level.

In most cases bird stakes will accompany seagrass transplants. However, at injury locations with a high density of fast-growing species such as *Halodule wrightii* in the undisturbed side populations, the insertion of bird stakes alone may be sufficient to facilitate re-colonization. This decision is based on factors including the exposure of the site to wave action, density of fast-growing species in the undisturbed side populations, and scar substrate composition.

The possibility for bird stakes interfering with vessel navigation, while present, is low, as bird stakes will be positioned in shallow water areas that should be avoided by motorized or wind powered vessels. In areas of high vessel traffic, additional steps may be taken to minimize the possibility of confusing stakes for navigational aids. This may involve the placement of additional bird stakes at either end of the prop scar, thereby essentially closing the restoration area to boaters. While it is possible stakes may need to be in place at the injury site for the full duration of the monitoring period when appropriate stakes will be removed as soon as recovery is well underway.

3.1.3 Seagrass Transplants

The planting of seagrass in injured areas is known to be an effective way of stabilizing the sediments and decreasing the injury recovery time (Fonseca et al. 1998). In combination with fertilization, planting faster growing opportunistic species like *Halodule wrightii* or

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[2] Note, although many areas of the Keys suffer from high levels of nitrogen loading from leaking septic tanks and other non-point sources, the relatively diffuse spread of these nutrients are not as effective in fostering seagrass recovery as a concentrated release of phosphorous and nitrogen fertilizer from roosting birds.

Syringodium filiforme serves as a temporary substitute for the climax species, *Thalassia testudinum*. This temporary substitution is referred to as "modified compressed succession" (Durako and Moffler, 1984; Lewis 1987). Depending on the environmental conditions at the restoration site, the selection of seagrass transplants as a preferred restoration alternative will vary. For example, transplants may be selected most frequently at more quiescent sites where the probability of transplant loss due to high water velocity is lowest.

Potential sources for seagrass transplants include selective removal from healthy seagrass beds located near the injury or from seagrass beds designated previously by NOAA and State of Florida as "donor" beds. Donor material will be collected in accordance with all necessary permits and in a manner to ensure that the donor seagrass beds are not degraded (Fonseca et al. 1998). No negative impacts to the ecological health of neighboring seagrass communities are anticipated from seagrass transplants.

The number of seagrass transplants and stakes required for propeller scars is determined according to general guidelines explained below. These guidelines are subject to change pending site-specific injury characteristics and the professional judgment of NOAA and the State of Florida restoration experts. In general, the first row of stakes and seagrass transplants are inserted 0.5 meters from the edge of the scar. If the propeller scar is wider than 0.5 meters then subsequent rows of stakes and seagrass transplants are inserted with 2.0 meters distance between each row. If the width of the scar is less than 0.5 meters, then a single row is placed in the middle of the scar. In each row, stakes are placed every 2.0 meters and seagrass transplants located every 0.5 meters between the stakes. For scars that have a wide and/or uneven scar geometry, for example, blowholes, the staking and seagrass transplant sequence is similar to that used for wide propeller scars; however in addition the perimeter of the blowhole is staked at 2.0-meter intervals. Over time, stakes may be re-positioned and additional seagrass transplants inserted as necessary.

3.1.4 Sediment Fill

The filling of blowholes or wide propeller scars is a rapid way of returning the seafloor to its original elevation and grade. In general, any excavation with an escarpment (i.e., drop-off) greater than 20 cm depth at the perimeter is considered a potential candidate for filling. The focus of this alternative is to stabilize the substrate as soon as possible after an incident to prevent further deterioration of the seagrass bed as a result of erosion and to prepare the area for re-colonization by neighboring or transplanted seagrasses. When this alternative is determined to be most appropriate, sediment fill (e.g., .25" inch limestone pea rock) will be transported to the site and directly placed in the designated injury areas. Sediment materials will be transported to the site by a means deemed feasible by the contractor selected to do the restoration. No visual impairment will occur and many of the repairs will be indistinguishable from surrounding substrate within a short period of time. All operations will conform to engineering specifications and comply with federal and state permits. No negative impacts to vessel navigation or the ecological health of neighboring seagrass communities are anticipated from the placement of sediment fill.

Fill will be placed in a blowhole or propeller scar to 10 cm. above grade. After fill is placed, it must be allowed to settle for at least 60 days before any other restoration action (e.g. staking, planting) is taken. If it is determined that the fill has settled below grade, it may be necessary to add more fill and wait another 60 days to establish whether or not it has settled.

3.2 Criteria for Restoration Alternatives

General criteria are considered for selecting the appropriate restoration alternatives for specific grounding sites. The following criteria (see Table 1) are used to evaluate and select the preferred restoration alternatives identified in this plan. These criteria satisfy the restoration objective while taking into account technical, environmental, economic and social factors.[3]

Table 1 - Criteria for Evaluating Restoration Options

Criteria	Definition
Technical Feasibility	Likelihood that a given restoration action will work at the site and that the technology and management skills exist to implement the restoration action.
Reduce Recovery Time	Measures that accelerate or sustain the long-term natural processes important to recovery of the affected resources and/or services injured or lost in the incident.
Reduce Potential for Additional Injury	Likelihood that the requirements, materials, or implementation of a restoration action minimizes the potential for additional injury.
Aesthetic Acceptability	Restoration alternatives that create substrates and topography that most closely resemble the surrounding habitat and minimize visual degradation.
Site Specific Context	Restoration alternatives are selected depending on the site specific context of environmental conditions at the site including but not limited to location, extent and severity of the injury, hydrological characteristics of the site, seagrass species composition, and other social and resource management concerns.

4. *EYE ONE* GROUNDING SITE AND PREFERRED RESTORATION ALTERNATIVES

4.1. Grounding Site[4]

[3] The order in which these criteria are listed in Table 1 does not reflect any measure of their relative importance.

[4] For more information about the site-specific characteristics of the injury location, including scar locations and species composition please see the injury assessment report.

On July 4, 2001, the *Eye One*, a 41' Chris-Craft cabin cruiser, ran aground on Bethel Bank, (near Marathon, FL) within state waters of the FKNMS (see Figures 1). Field personnel from NOAA's Damage Assessment Center assessed the extent of seagrass injury caused by the *Eye One*, hereinafter referred to as "vessel" on July 5, 2001. The assessment was conducted with differentially corrected, surveying-grade digital global positioning system equipment (DGPS).

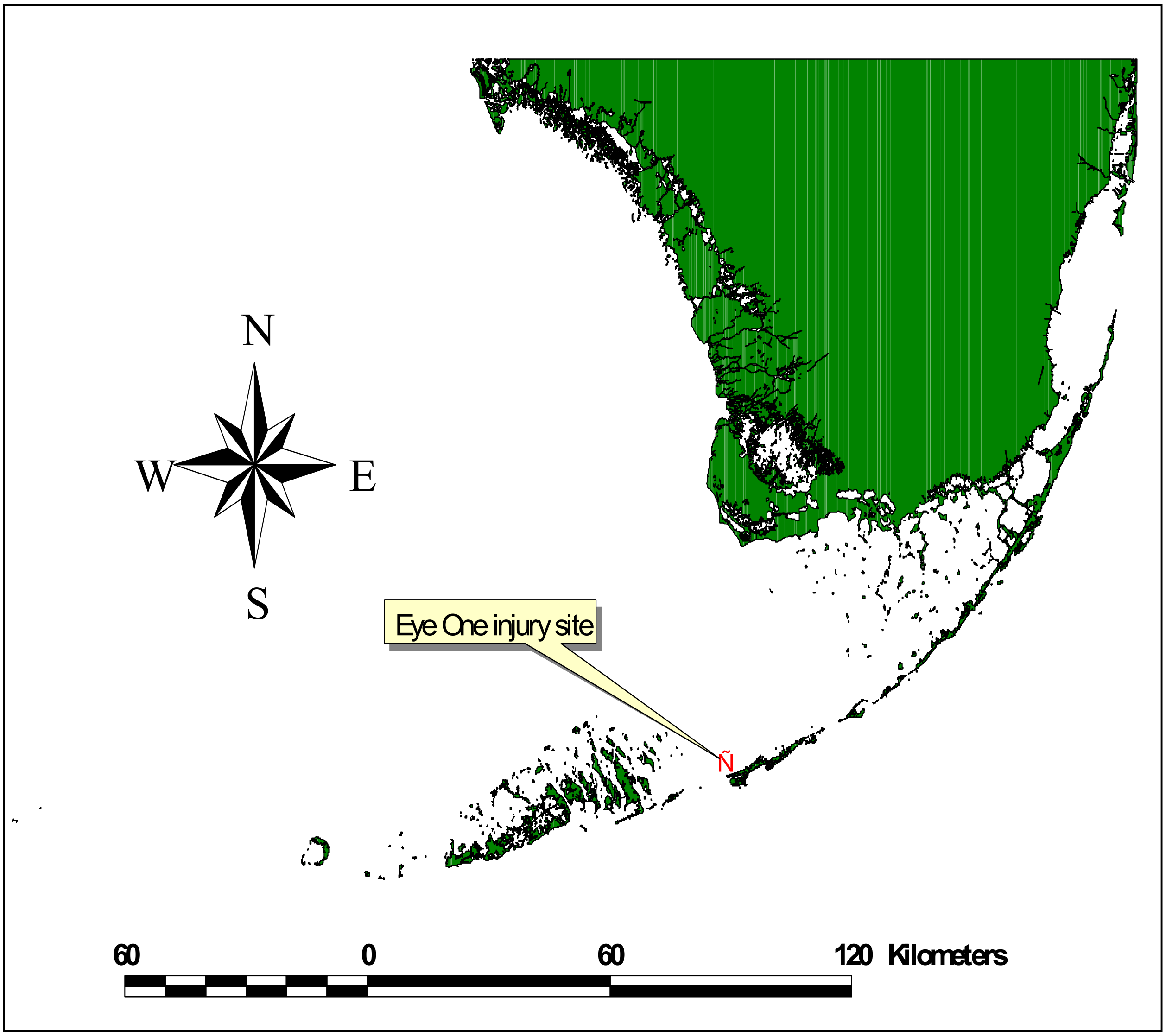

Figure 1. Location of *Eye One* injury site

The grounding site was mapped by physically tracing the outline of

the injury feature with the DGPS. The coordinates generated from the mapping were downloaded to a geographic information system (GIS) program to calculate the square meters of injury.

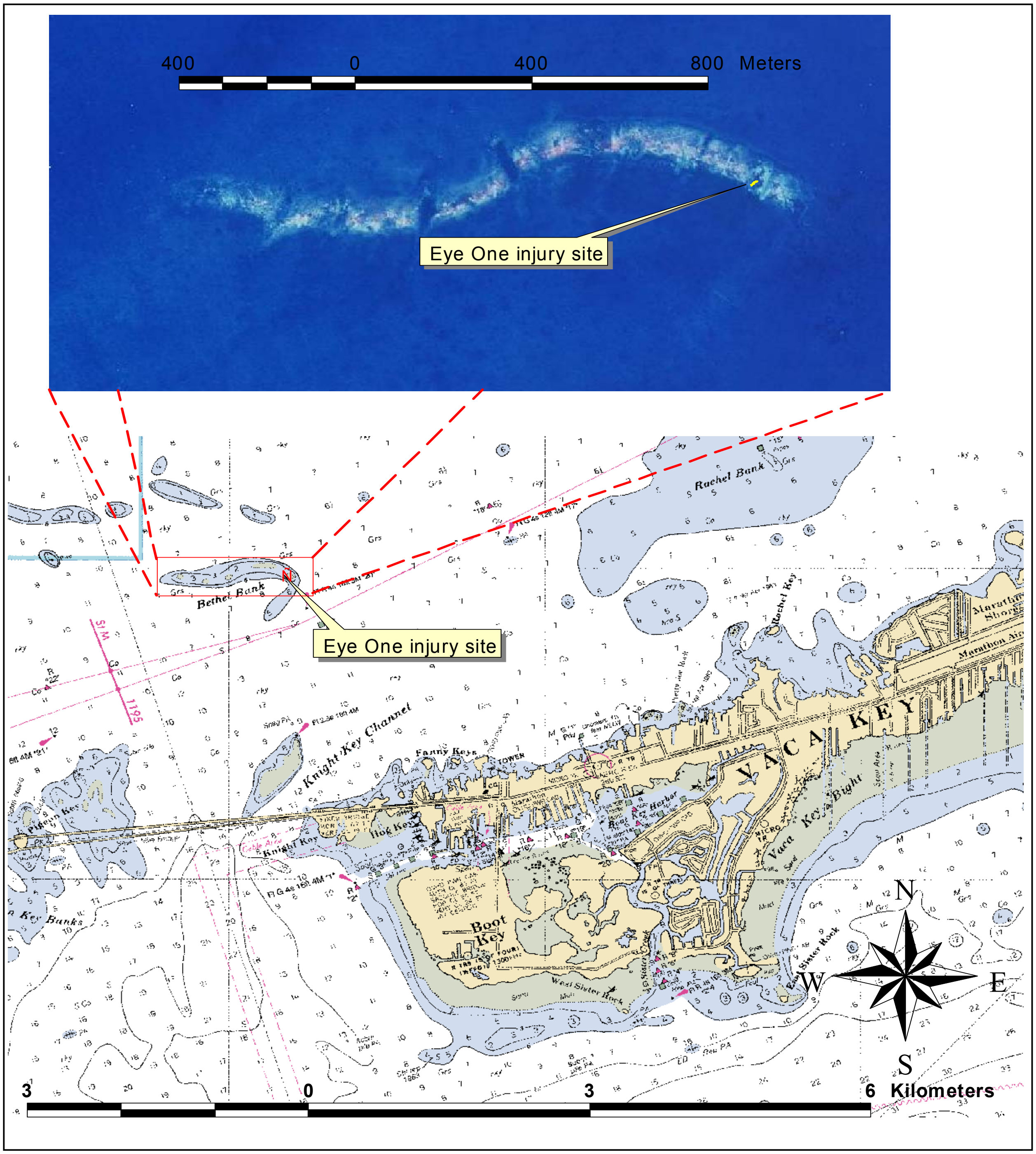

Figure 2. Location of *Eye One* injury site on NOAA Chart #11449 and 1995 Digital Ortho Quarter Quad photo with injury superimposed in yellow (injury is geographically correct and to scale).

This grounding occurred on a shallow seagrass bank characterized as a mixed seagrass community, consisting of *Syringodium filiforme* (Manatee Grass) and *Thalassia testudinum* (Turtle Grass). Other living components include sponges and various invertebrates typical of seagrass meadows in this area of the FKNMS, various species of macroalgae, and numerous species of fishes. The sediments consist of *Porites spp*. coral rubble, sand and *Halimeda spp.* algal fragments.

The injury consisted of a blowhole, a berm and a bow/keel scar (see Figure 3). The blowhole had a planimetric area of 27.16 m^2 with a maximum depth of 1.0 meters below the surrounding seafloor (see Figure 4). The volume of material removed is calculated to be 12.65 m^3 with a baseline of 0.6 meter below water level. The bow scar extended from the blowhole for 3.57 meters with an average width of 0.28 meters. Due to overlap of the features, the bow scar and blowhole were merged in Arcview before calculating the area impacted. The material excavated from the blowhole created berm to the north of the blowhole (see Figure 3). This berm covered an area of 35.51 m^2 of seagrass bottom cover.

The total area impacted is calculated to be 63.65 m^2 of *seagrass* bottom cover, mixed *Thalassia testudinum* (Turtle grass) and *Syringodium filiforme (*Manatee Grass*)*.

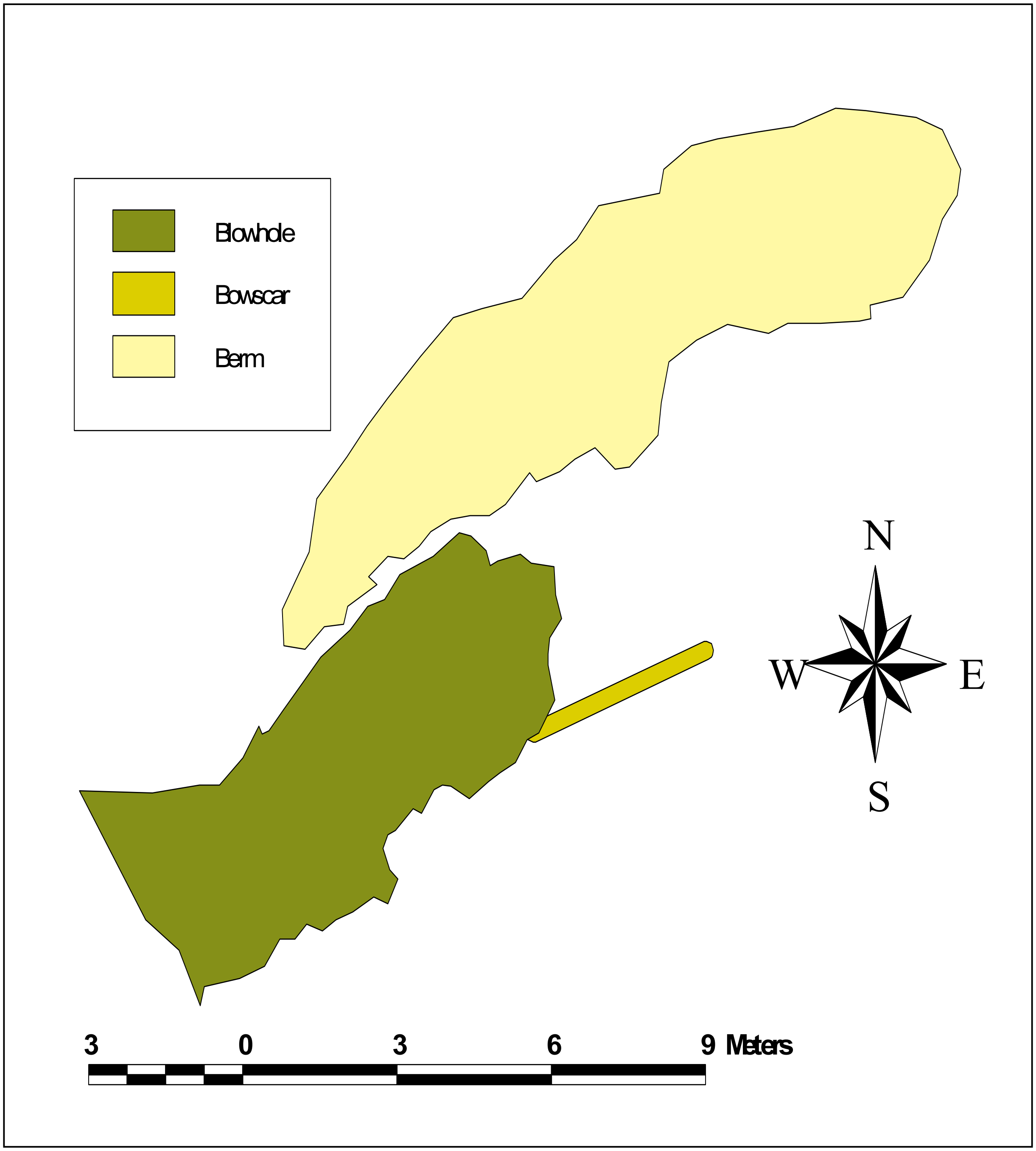

Figure 3. Physical dimensions of *Eye One* injury.

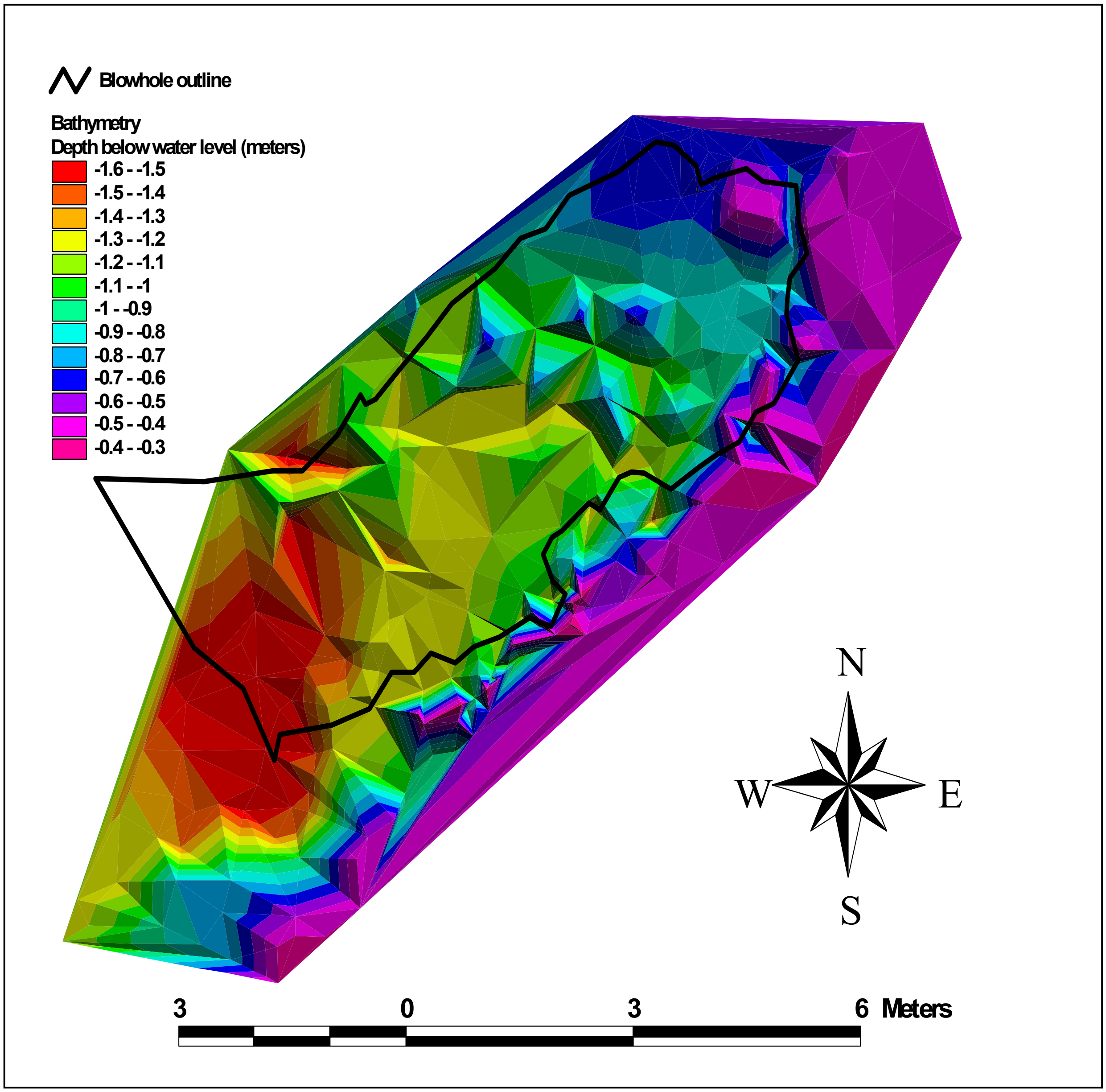

Figure 4: Balthymetry of *Eye One* injury site.

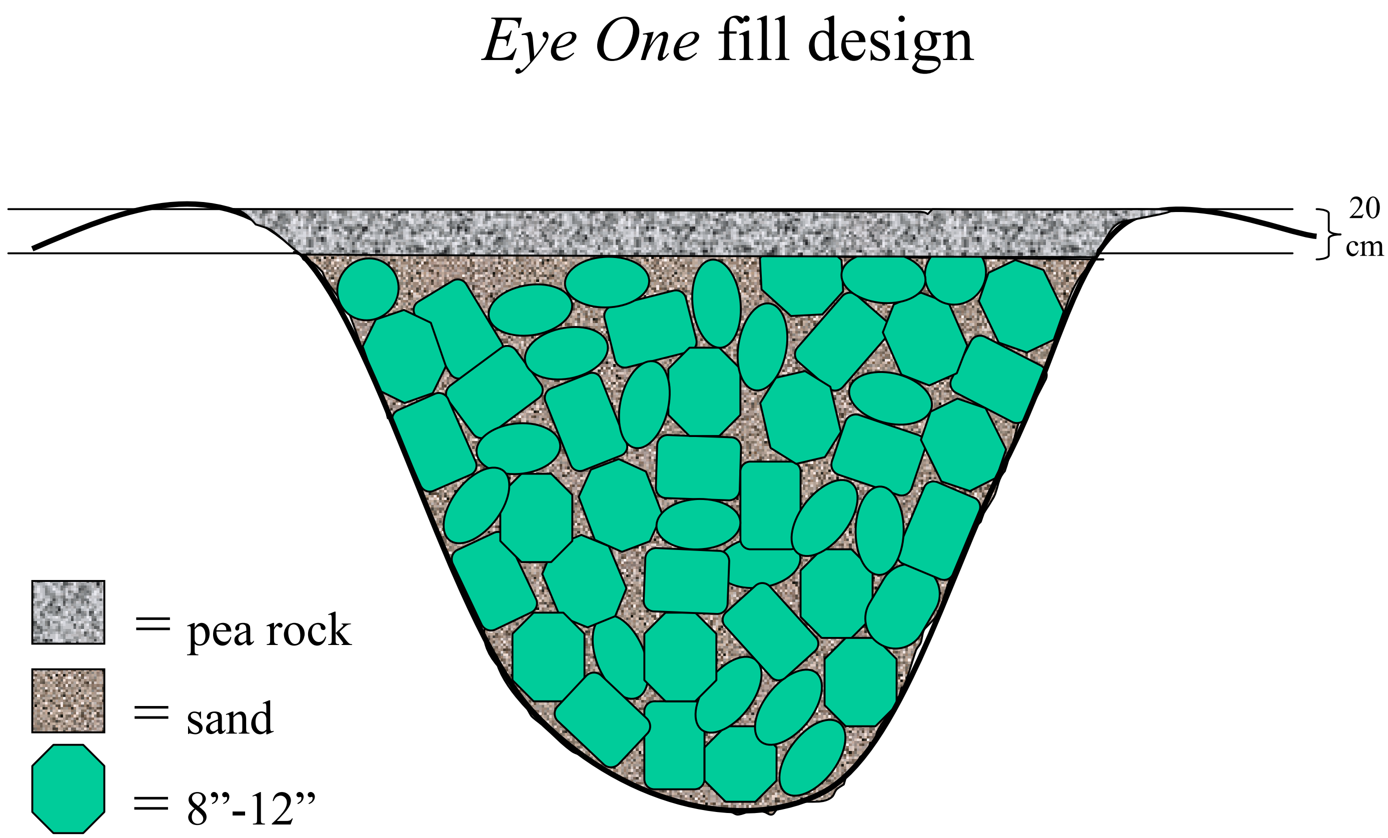

Figure 5. *Eye One Restoration* Action (sediment fill)

4.2 Preferred Primary Restoration Alternatives

The preferred primary restoration action for the *Eye One* is to fill the blowhole with a core material of 8” to 12” limestone rock and then cover it with sand to fill the voids. These rocks will be washed prior to transport thereby reducing turbidity during placement. This heavier larger fill will be used as a retention device for the sediment as the hole is open and exposed on one side. This core material will then be covered with 52.72 cm layer of pea or rice rock. Quantities are estimated at 11 cubic yards of core material, 3 cubic yards of sand, and 6.5 cubic yards of pea rock (this includes the extra 10 cm.).

No stakes or plants will be used in this case due to the area’s high current velocity.

It is important that this work be completed in a timely manner to prevent further degradation at the injury site. Therefore, restoration actions will be initiated as soon as sufficient funds are collected.

5. COMPENSATORY RESTORATION

To compensate the public for lost interim ecological services from the time of the injury until the return of baseline conditions requires additional off-site restoration action. This "compensatory restoration" takes place within similar types of seagrass grounding injuries. The area determined as necessary for compensatory restoration depends upon both the initial size and severity of the seagrass injury, and how quickly the seagrasses and associated ecological services return to baseline. An assessment methodology known as Habitat Equivalency Analysis (HEA) is used to determine the number of compensatory square meters of seagrass restoration (Fonseca et. al. 2000). The HEA is an economic and biological model that combines biological data collected at the injury site with standard economic principles of natural resource damage assessment. The biological data takes into account the baseline seagrass conditions at the injury site, species type, density, area, and severity of seagrass lost due to the injury, and estimated time for a return to baseline conditions. The economic components of the model, among others, apply a 3 percent discount rate and project the benefits of the compensatory restoration project into perpetuity.

The amount of compensatory restoration appropriate for this grounding may be pooled with compensatory recoveries from other sites. Pooled recoveries will be used to implement large compensatory restoration projects and achieve economies of scale. Accordingly, the responsible party would pay only a portion of the fixed costs associated with a compensatory restoration project. All of the identified compensatory restoration methods, monitoring, and oversight requirements are the same as in the case of primary restoration activity.[5]

Preferred compensatory restoration:

a) Bird stakes and seagrass transplants in propeller scars. Compensatory restoration for the *Eye One* grounding requires transplanting 4 seagrass units (*Halodule wrightii*) and the insertion of 3 stakes in propeller scars over a total area of 1.29 square meters. The placement of stakes and transplanting units of seagrass will follow the guidelines described in Section 4.

b) Sediment fill: In addition, 0.47 cubic meters of sediment fill will be placed in a blowhole to help stabilize the site and facilitate conditions for recovery.

6. MONITORING

Monitoring for both primary and compensatory restoration projects is necessary to determine whether the projects are providing services in a manner consistent with restoration goals and to assess the potential need for mid-course corrections to ensure that the projects meet designated restoration performance standards. The design of the monitoring program must permit the

[5] A copy of the Habitat Equivalency Analysis and more detailed explanation of the procedure are available upon request.

detection of, and response to, significant changes in seagrass recovery rates or damage to restoration components (bird stakes, seagrass transplants, sediment fill, etc.) as a result of external events, such as major storms or vandalism.

6.1 Site Identification

The grounding injury can be re-located by future monitoring teams by referencing the documented differential global positioning system coordinates.

6.2 Monitoring Variables

The following monitoring parameters will be observed and/or measured at the site(s):

- initial survival of seagrass transplants;
- incidence of seagrass re-colonization from transplants and or the undisturbed side populations;
- structural integrity of the bird stakes, planting units, and or sediment fill; and
- growth and survival rates of transplanted seagrass;
- distribution and abundance of seagrass in surrounding "reference" sites.

6.2.1 Monitoring Data Processing and Utility

Monitoring events will assess transplant and natural re-colonization via measures of planting unit (PU) survival, shoot density, areal coverage, and documentation with video transects. The execution and application of the monitoring effort is adapted from "Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters", available at: http://shrimp.bea.nmfs.gov/library/digital.html - under "Appendices" - pages 207-220, or http://www.cop.noaa.gov/pubs/das/das12.html . Briefly, the monitoring data will be used to determine if successful establishment of planted seagrass has occurred and if it is on an appropriate recovery trajectory. If not, these data will be used to plan and execute remedial restoration. The success criteria are: 1) whether planted material has a minimum of one rhizome apical per PU, 2) a PU survival rate 75% of the planting units having established themselves by the end of Year 1. If it is determined that less than 75% survival has occurred by the end of Year 1, then remedial planting should occur during the next available planting period to bring the percentage survival rate to the minimum standard by the next monitoring survey, and 3) the measured growth rate of bottom coverage from either direct quadrat surveys or video-based assessment (p. 220 above; Braun-Blanquet assessment). The growth rate should be considered successful if, starting after one year, the planted, pioneering species of seagrass in the scars (restoration sites) is projected with 95% statistical confidence, to achieve complete bottom coverage (with pre-injury levels of shoot density) within the five year monitoring period for original plantings. If this criterion is not met, then remedial planting should occur during the next available planting period. Videotaping is also performed to provide an unambiguous record of the status of the restoration that is particularly valuable to parties not familiar with seagrass systems and interpretation of statistical data.

Additionally, the seagrass immediately surrounding the injury site (e.g. "reference site") will also be monitored. This action will be taken to determine if background impacts not related to the restoration (that cannot be controlled nor affected through a mid-course correction), such as poor water quality or disease, may affect transplant and natural re-colonization of the restoration site. The purpose of monitoring the reference site is not to compare its coverage and density to that of the restoration site as recovery of the restoration site will take place over a longer time horizon than the duration of monitoring. Monitoring of reference sites will include documentation of percent cover by Braun Blanquet quadrat analysis.

6.3 Monitoring Schedule

The primary restoration monitoring plan developed for this site requires a principal and assistant biologist to complete seven monitoring events over a five-year period, plus one quality assurance, or baseline, event immediately after the restoration is complete (see Table 2). During the first year, three monitoring events are scheduled at intervals of 0 (baseline), 180 and 360 days. Two monitoring events are conducted the second year. Monitoring events will assess transplant and natural re-colonization survival, shoot density, aerial coverage, and documentation with video transects of the restored areas. They will also record the percent cover of seagrass in reference sites through Braun Blanquet analysis, according to the same methods utilized in injury assessment. This reference site analysis should be conducted on the same transect at each monitoring event. As conditions at the restoration site are subject to change from storms or climatic events, one additional monitoring event is scheduled per year for years three through five (at 180 days) to assess restoration recovery, and if necessary, to conduct mid-course corrections (e.g., replanting of seagrass, insertion of stakes, etc.).

Each monitoring event will consist of two biologists working approximately two days per monitoring event. The number of days per monitoring event reflects travel time and the possibility of inclement weather that may necessitate multiple visits to the site. Two biologists are necessary for safety as well as for reducing the potential for errors in measurements, plantings, and observations. Following each field trip, up to one day will be required to process the observations and measurements, enter information into a database, analyze the data and prepare a report. Also included in this period is the time necessary to transcribe field notes, develop film, and identify and record all photographic slides and/or videotapes.

Table 2. Categories and Timing of Primary Monitoring

		Survival Monitoring	Braun Blanquet Abundance (restored site)	Braun Blanquet Abundance (reference site)	Video Transects
Year 1	0 days (baseline)	x			x
	180 days	x	x	x	x
	360 days	x	x		x
Year 2	180 days		x	x	x
	360 days		x		x
Year 3	180 days		x	x	x
Year 4	180 days		x	x	x
Year 5	180 days		x	x	x
number of PUs sampled		Every PU	Scars: Every PU; Holes/Berms: Minimum of 10% of PUs		Scars: Every PU; Holes/Berms: 5 randomly selected rows (if<5 row; all)

***Note: PU=Planting Unit**

7. ENVIRONMENTAL REVIEW, SUPERVISION AND PERMITTING

Restoration projects are subject to local, state, and federal regulations that require project review and issuance of appropriate environmental permits. The costs of these activities are also part of the damages claim.

7.1 Categorical Exclusion

NOAA believes that, because of the scope and nature of this restoration plan, it will qualify for a categorical exclusion (CE) under the National Environmental Policy Act (NEPA). A CE would eliminate the requirement to conduct a more detailed and costly Environmental Assessment (EA).

7.2 Permitting

Implementation of restoration projects requires environmental permitting. NOAA believes this restoration activity can be implemented under a Letter of Authorization under the FKNMS Manager's Permit. In addition, a de-minimis exemption letter will be requested from the Florida Department of Environmental Protection for compliance with Environmental Resource Permit Requirements. If seagrass transplants are used, an Aquatic Plant Permit is also required under Florida Statutes Chapter 369. For restoration projects requiring sediment fill, a permit will be requested from the U.S. Army Corps of Engineers.

7.3 Supervision of Restoration Activities

NOAA and/or the State of Florida will supervise any contractor activities to ensure compliance with restoration goals, objectives and performance criteria. Construction activities by the selected contractors whether contracted by NOAA or a cooperative responsible party, will require on-site supervision by NOAA and/or State field staff.

8. RESTORATION AND MONITORING COSTS

For this injury, the owner and/or operator are liable to federal and state trustees for all costs associated with response, damage assessment, and environmental restoration. The specific measure of financial liability for injuries to resources claimed by the Sanctuary trustees is the sum of: (1) "Response, Damage Assessment, and Interest Costs," the costs to respond to the grounding, assess damages, and interest associated with delayed payment; (2) "Primary Restoration, Monitoring, and Oversight Costs," the cost of implementing restoration, monitoring, and oversight actions necessary to return the injured sanctuary resources and services to their pre-injury levels; and (3) "Compensatory Restoration, Monitoring, and Oversight Costs," the cost of implementing restoration, monitoring, and oversight actions scaled to compensate the public for the lost resource services from the time of injury until full recovery. In order to account for uncertainties inherent in natural resource restoration projects, NOAA and the State of Florida use a contingency rate of twenty five percent on all components of the claim. This rate is comparable to those used by other federal agencies.

8.1 Response, Damage Assessment and Interest Costs

Response and damage assessment costs include, but are not limited to: contract costs for vessel salvage and other emergency response actions; the cost of field and office assessment of the injury site, including travel; boat and equipment costs, labor costs of modeling injury recovery and completion of the Habitat Equivalency Analysis; and the labor costs associated with developing and settling the claim. Interest is calculated on a quarterly basis and added to assessment costs.

8.2 Primary Restoration, Monitoring and Oversight Costs

Primary restoration costs include the labor and materials associated with the completion of the preferred restoration action(s). Monitoring costs include labor time, boat costs, travel costs, lodging costs, per diem, report preparation time and potentially additional costs depending on the site complexity. An additional contingency of 30% is applied only to the costs of seagrass transplants to account for typical mortality rates. Oversight costs account for all necessary permits and labor time to comply with NEPA and other state and federal laws and oversee the restoration implementation to ensure that all construction specifications, quality control measures and/or performance standards are met by the contractors implementing the restoration project.

8.3 Compensatory Restoration, Monitoring, Oversight Costs

The compensatory restoration methods, monitoring, and oversight cost categories are the same as those listed for primary restoration. The number of square meters calculated as necessary for compensatory restoration will be combined with compensatory restoration requirements from similar grounding incidents to achieve cost savings associated with economies of scale for the implementation of a larger compensatory restoration project.

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